APPEAL BRIEF

Katherine R. Vieyra
Attorney for Appellant
Registration No.: 47,155

Scully, Scott, Murphy & Presser, P.C.
400 Garden City Plaza, Suite 300
Garden City, New York 11530
(516) 742-4343

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Yoshikazu Kakura	**Examiner**:	Tangela T. Chambers
Serial No.:	10/561,128	**Art Unit**:	2617
Filed:	December 16, 2005	**Docket**:	19446
For:	SPREAD CODE ASSIGNING METHOD IN CODE SPREAD RADIO COMMUNICATION USING A PLURALITY OF TRANSMISSION/RECEPTION ANTENNAS AND CODE SPREAD RADIO COMMUNICATION SYSTEM USING THE SAME	**Dated**:	October 1, 2010

Confirmation No. 5920

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Sir:

Pursuant to 35 U.S.C. § 134 and 37 C.F.R. § 41.37, entry of this Appeal Brief in support of the Notice of Appeal filed August 6, 2010 in the above-identified matter is respectfully requested. This paper is submitted as a brief setting forth the authorities and arguments upon which Appellant relies in support of the appeal from the Final Rejection of Claims 2-17 in the above-identified patent application on April 6, 2010. The rejection of Claims 2-17 currently remains.

I. REAL PARTY OF INTEREST

The real party in interest is NEC Corporation, assignee of 100% interest of the above-referenced patent application.

II. RELATED APPEALS AND INTERFERENCE

There are no other appeals or interferences known to Appellant, Appellant's legal representative or Assignee, which would directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 2-17 are pending in the Application. Claims 2-17 are being presented on appeal and are set forth fully in the attached Claims Appendix.

Claims 2-4 and 13-15 are rejected under 35 U.S.C. § 102(e) as anticipated by Kuwahara et al., U.S. Patent No. 6,804,216 (hereinafter "Kuwahara"). Claims 10 and 11 are rejected under 35 U.S.C. § 102(e) as anticipated by Sudo, U.S. Patent No. 7,298,722. Claim 5 is rejected under 35 U.S.C. § 103(a) as unpatentable over Kuwahara in view of Aoki et al., U.S. Patent Application Publication No. 2004/0028157 (hereinafter "Aoki"). Claim 6 is rejected under 35 U.S.C. § 103(a) as unpatentable over Kuwahara in view of Sudo. Claim 7 is rejected under 35 U.S.C. § 103(a) as unpatentable over Kuwahara in view of Aoki, and further in view of Sudo. Claim 8 is rejected under 35 U.S.C. § 103(a) as unpatentable over Kuwahara in view of Goto, U.S. Patent Publication No. 2002/0037030. Claim 9 is rejected under 35 U.S.C. § 103(a) as unpatentable over Kuwahara in view of Aoki and further in view of Goto. Claims 12, 16 and 17 are rejected under 35 U.S.C. § 103(a) as unpatentable over Sudo in view of Kuwahara.

Appellant respectfully appeals the rejection of Claims 2-4 and 13-15 as allegedly

anticipated by Kuwahara, claims 10 and 11 as allegedly anticipated by Sudo, and claims 5-9, 12, 16 and 17 as allegedly unpatentable over Kuwahara in view of Sudo, Aoki, and Goto, which are the sole issues in this Appeal.

IV. STATUS OF AMENDMENTS

No amendment to the claims was filed in Response to the Final Rejection mailed April 6, 2010. Appellant filed a Request for Reconsideration on June 17, 2010 and timely filed a Notice of Appeal on August 6, 2010. Therefore, the claims are pending as set forth in the Claims Appendix.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Claims 2-17 are the claims on appeal. A copy of the rejected claims is attached hereto in the Claims Appendix.

Appellant mentions that reference numbers, figure numbers and references to passages in the Specification used in this section and other sections of the Appeal Brief are provided merely for the benefit of the Board and for meeting the requirements set forth in 37 C.F.R. § 41.37(c)(v) and are not meant to limit the scope of the claimed invention in any manner.

The invention with respect to claim 2 comprises a spread code assigning method, for use in a code spread radio communication system including a first radio transmission device (Ref. #11, page 13, line 28) provided with a transmitter (Ref. #101) for transmitting different first through Mth code spread transmission signals from each of M (M is an integer of 2 or more) transmission antennas (Ref. #111, #112), and a second radio transmission device (Ref. #12) provided with a receiver (Ref. #102) for receiving and demodulating the first through Mth code spread transmission signals through N (N is an integer of 1 or more) reception antennas (Ref. #121, #122), for assigning spread codes to each of the transmission antennas (Ref. #111, #112),

comprising: calculating (page 16, lines 11-13) a correlation value of each of the propagation paths between the transmission antennas (Ref. #111, #112) and the reception antennas (Ref. #121, #122); preferentially assigning (page 20, lines 22-28), to the ith (i is an integer of 1 or more and M or less) transmission antenna having a propagation path of a correlation value exceeding a predetermined threshold value, only spread codes orthogonal to the spread codes of the jth (j is an integer of 1 or more and M or less, $i \neq j$) transmission antenna corresponding to the correlation value or spread codes having a small cross correlation value to spread codes of the jth transmission antenna corresponding to the correlation value, and assigning (page 20, line 28 to page 21, line 3), to a transmission antenna having no propagation path of a correlation value exceeding the threshold value, spread codes without considering orthogonality to spread codes in the other transmission antennas (Ref. #111, #112).

The invention with respect to claim 10 comprises a spread code assigning method, for use in a code spread radio communication system including a first radio transmission device (Ref. #11) provided with a transmitter (Ref. #201) for transmitting different first through Mth code spread transmission signals from each of M (M is an integer of 2 or more) transmission antennas (Ref. #111, #112), and a second radio transmission device (Ref. #12) provided with a receiver (Ref. #202) for receiving and demodulating the first through Mth code spread transmission signals through N (N is an integer of 1 or more) reception antennas (Ref. #121, #122), for assigning spread codes to each of the transmission antennas (Ref. #111, #112) comprising: detecting (page 23, lines 20-26) a reception quality (page 24, lines 4-5) at a time when each of said code spread transmission signals is received; reducing (page 25, lines 25-26), in the case that the detected reception quality (page 24, lines 4-5) is below an object minimum value, a maximum value of number of the spread codes assigned to the transmission antenna

corresponding to the reception quality (page 24, lines 4-5), and increasing (page 25, lines 10-14), in the case that the detected reception quality (page 24, lines 4-5) exceeds an object maximum value (page 25, line 11), the maximum value of the number of spread codes assigned (page 25, line 13) to the transmission antenna (Ref. #111, #112) corresponding to the reception quality (page 24, lines 4-5).

The invention with respect to claim 13 comprises a code spread radio communication system including a first radio transmission device (Ref. #11) provided with a transmitter (Ref. #101) for transmitting different first through Mth code spread transmission signals from each of M (M is an integer of 2 or more) transmission antennas (Ref. #111, #112), and a second radio transmission device (Ref. #12) provided with a receiver (Ref. #102) for receiving and demodulating the first through Mth code spread transmission signals through N (N is an integer of 1 or more) reception antennas (Ref. #121, #122), wherein the receiver (Ref. #102) is provided with a correlation value estimation unit (Ref. #108) for calculating a correlation value of each propagation path between each of the transmission antennas (Ref. #111, #112) and each of the reception antennas (Ref. #121, #122) and transmitting the calculated result as propagation path correlation information (page 16, line 14), wherein the transmitter (Ref. #101) is provided with a spread code assigning unit (Ref. #106), and wherein the spread code assigning unit (Ref. #106), based on the propagation path correlation information (page 16, line 14), assigns (page 20, lines 22-28), to the ith (i is an integer of 1 or more and M or less) transmission antenna having a propagation path of a correlation value exceeding a predetermined threshold value, only spread codes orthogonal to the spread codes of the jth (j is an integer of 1 or more and M or less, $i \neq j$) transmission antenna corresponding to the correlation value, and assigns (page 20, line 28 to page 21, line 3), to a transmission antenna having no propagation path of a correlation value

exceeding the threshold value, spread codes without considering orthogonality to spread codes in the other transmission antennas (Ref. #111, #112).

The invention with respect to claim 16 comprises a code spread radio communication system including a first radio transmission device (Ref. #11) provided with a transmitter (Ref. #201) for transmitting different first through Mth code spread transmission signals from each of M (M is an integer of 2 or more) transmission antennas (Ref. #111, #112), and a second radio transmission device (Ref. #12) provided with a receiver (Ref. #202) for receiving and demodulating the first through Mth code spread transmission signals with N (N is an integer of 1 or more) reception antennas (Ref. #121, #122), wherein the receiver (Ref. #202) is provided with a reception quality detection unit (Ref. #204) for detecting reception quality (page 24, lines 4-5) at a time when each of the code spread transmission signals is received and a code multiplex number control signal generating unit (Ref. #205), the code multiplex number control signal generating unit (Ref. #205), in the case that the reception quality (page 24, lines 4-5) is below an object minimum value, transmitting (page 24, lines 20-28) the code multiplex number control information indicating decreasing of the maximum value of the number of spread codes assigned to the transmission antenna (Ref. #111, 112) corresponding to the concerned reception quality (page 24, lines 4-5), and also, in the case that the reception quality (page 24, lines 4-5) exceeds an object maximum value, transmitting the code multiplex number control information (page 22, lines 22-23) indicating increasing of the maximum value of the number of spread codes assigned to the transmission antenna (Ref. #111, #112) corresponding to the concerned reception quality (page 24, lines 4-5), and wherein the transmitter (Ref. #201) is provided with a spread code assigning unit (Ref. #103) for assigning spread codes to each of the transmission antenna (Ref. #111, #112) based on the code multiplex number control information (page 22, lines 22-23).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The issues presented for review by the Board of Patent Appeals and Interferences are a) whether independent Claims 2 and 13 and dependent claims 3-9, 14 and 15 are patentable over Kuwahara, alone or in combination with Aoki, Sudo, Goto, and b) whether independent claims 10 and 16 and dependent claims 11, 12 and 17 are patentable over Sudo, alone or in combination with Kuwahara.

VII. ARGUMENT

(A) Examiner's Rejection of Claims 2-4 and 13-15 under 35 U.S.C. § 102 as anticipated is not proper

Claims 2-4 and 13-15 stand rejected under 35 U.S.C. § 102 as anticipated by Kuwahara.

Kuwahara discloses a general structure for W-CDMA in which different long codes are assigned to different cells or sectors, and different short codes are assigned to different users within a cell or sector. Although Kuwahara mentions that a transmitter can be provided with a plurality of antennas, Kuwahara does not teach how a system with a plurality of antennas could be implemented. Instead, Kuwahara considers only the assignment of the codes between the users and between the base stations. Kuwahara never considers the assignment of different codes between the antennas in the base station because, *inter alia*, Kuwahara teaches details regarding only one antenna per transmitter. Kuwahara does not teach or suggest a relationship between or among antennas, and Kuwahara does not teach or suggest a plurality of antennas at a base station or its transmitter.

Further, Kuwahara discloses a method for assigning spread codes to channels that is different from the method for assigning spread codes to transmission antennas, as recited in the claims of the present invention. Kuwahara discloses that for channels (propagation paths) having

a high degree of space correlation, spread codes that are low in terms of code correlation are assigned using the same long code (column 12, line 66 to column 13, line 2).

By contrast, independent claims 2 and 13 recite assigning spread codes to a transmission antenna by "preferentially assigning, **to the *i*th ... transmission antenna** having a propagation path of a correlation value exceeding a predetermined threshold value, only spread codes orthogonal to the spread codes **of the jth ... transmission antenna** corresponding to the correlation value or spread codes having a small cross correlation value to spread codes of the jth transmission antenna corresponding to the correlation value". Kuwahara does not teach or suggest these features. In particular, Kuwahara merely suggests that more than one antenna might be present but does not teach or suggest assigning spread codes to an *i*th transmission antenna in accordance with a correlation value of a *j*th antenna, because Kuwahara does not teach either a system with multiple antennas (instead merely acknowledging that a plurality of antennas could exist), or assigning spread codes to an *i*th antenna, the spread codes having small cross correlations to spread codes of a *j*th antenna.

It has been held by the courts that "Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim." *Lindemann Maschinenfabrik GMBH v. American Hoist and Derrick Company et al.*, 730 F.2d 1452, 221 USPQ 481 (Fed. Cir. 1984). As illustrated above, Kuwahara does not disclose assigning spread codes to a transmission antenna according to spread codes of other transmission antennas, so that Kuwahara does not disclose every feature of the invention as recited in independent claims 2 and 13. Consequently, these independent claims are not anticipated by the art of record in the application. Claims 3 and 4 depend from claim 2, and claims 14 and 15 depend from claim 13, each dependent claim incorporating all of the features and limitations of

its base claim. Accordingly, these dependent claims are not anticipated by the art of record in the application for at least the reasons that their base claims are not anticipated by the art of record in the application.

Thus, Appellant submits that the rejection of claims 2-4 and 13-15 under 35 U.S.C. § 102 is in error and must be reversed.

(B) The Examiner's rejection of claims 10 and 11 under 35 U.S.C. § 102 as anticipated is not proper

Claims 10 and 11 stand rejected under 35 U.S.C. § 102 as anticipated by Sudo.

The Examiner states that the recitation of "a transmitter for transmitting different first through Mth code spread transmission signals from each of M (M is an integer of 2 or more) transmission antennas" in independent claim 10 has not been given patentable weight because the recitation occurs in the preamble. Appellant respectfully submits that this recitation should be given patentable weight because the body of the claim depends on this feature for completeness; the process recited in the claim cannot stand alone without this feature. Appellant respectfully points out that spread codes assigned to the transmission antenna is recited in the body of the claim in two of the claim's steps: in the reducing step and in the increasing step, that is, both of these steps recite reducing/increasing spread codes assigned to **the** antenna. Thus the feature of a transmitter transmitting from each of M transmission antennas is not merely mentioned in the preamble but is necessary to complete the claim. Accordingly, this feature should be given patentable weight.

The Courts have held that the determination of whether preamble recitations are structural limitations or mere statements of purpose or use can be resolved only on review of the entirety of the application to gain an understanding of what the inventors actually invented and intended to

encompass by the claim. *Corning Glass Works v. Sumitomo Elec. USA, Inc.,* 868 F.2d 1251, 1257,9 USPQ2d 1961,1966. Independent claim 10 is based on MIMO in which one radio transmission device, e.g., base station, transmits two or more transmission sequences, e.g., signal sequences, with two or more antennas. Claim 10 recites a spread code assigning method that reduces, when a detected reception quality is below an object minimum value, a maximum value of the number of the spread codes assigned to the transmission antenna corresponding to the reception quality, and increases, when the detected reception quality exceeds an object maximum value, the maximum value of the number of spread codes assigned to the transmission antenna corresponding to the reception quality.

By contrast, Sudo discloses one base station that transmits only one transmission sequence (see columns 25-26). A signal level of spread codes to be assigned to the base station is decided in consideration of a reception characteristic in a receiving end. Sudo discloses that the signal level of subcarriers with a low degree of signal multiplexing and/or with a high degree of signal multiplexing is changed adaptively (column 26, lines 17-24). Sudo does not teach or suggest changing the maximum value of the number of spread codes assigned to the transmission antenna, as recited in independent claim 10. Thus, Sudo does not teach each feature of the present invention as recited in claim 10, so that this independent claim, along with its dependent claim 11, are not anticipated by Sudo.

Thus, Appellant submits that the rejection of claims 10 and 11 under 35 U.S.C. § 102 is in error and must be reversed.

(C) Claims 5-9 are patentable based on dependency on independent claim 2

Appellant respectfully submits that Claims 5-9 are patentable over the cited prior art based upon at least the analysis provided above. Specifically, the hypothetical combination of

Kuwahara and Aoki, Sudo, and Goto fails to teach, suggest, or render obvious each and every limitation of independent claim 2, from which Claims 5-9 depend.

As illustrated above, Kuwahara fails to teach or suggest assigning spread codes to a transmission antenna according to spread codes of other transmission antennas. None of the art of record overcomes this deficiency and the Examiner does not state otherwise. Aoki is cited for allegedly teaching a standard correlation value calculated based on a cross correlation value of each of the propagation paths between the M transmission antennas and the N reception antennas. Sudo is cited for allegedly teaching a standard correlation value is the maximum value among the (M-1) x N correlation values. Goto is cited for allegedly teaching a standard correlation value is an average value among the (M-1) x N correlation values.

It has been held by the courts that to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. See, *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). As illustrated above, the hypothetical combination of Kuwahara, Sudo, Aoki, and Goto, taken singly or in any combination, does not disclose or suggest assigning spread codes to transmission antennas according to spread codes of other transmission antennas as recited in independent claim 2, and does not teach or suggest each and every feature of the present invention as recited in these independent claims. Thus *prima facie* obviousness has not been established, so that dependent claims 5-9 patentably distinguish over the art of record in the application.

Thus, Appellant submits that the rejection of claims 5-9 under 35 U.S.C. § 103 is in error and must be reversed.

(D) Examiner's Rejection of Claims 12, 16 and 17 under 35 U.S.C. § 103 as unpatentable over Kuwahara and Sudo is not proper

Claims 12, 16 and 17 stand rejected under 35 U.S.C. § 103 as unpatentable over Kuwahara and Sudo.

As illustrated above, Sudo does not disclose changing the maximum value of the number of spread codes assigned to the transmission antenna, as recited in independent claims 10 and 16. Kuwahara does not overcome this deficiency and the Examiner does not state otherwise. As illustrated above, Kuwahara does not teach or suggest multiple antennas or assigning spread codes to antennas. Thus *prima facie* obviousness has not been established, so that independent claims 10 and 16, and their dependent claims 12 and 17, respectively, patentably distinguish over the art of record in the application.

Thus, Appellant submits that the rejection under 35 U.S.C. § 103 is in error and must be reversed.

(E) Conclusion

Based on the above arguments and remarks, Appellant respectfully submits that the claims of the instant invention on appeal are not anticipated or obvious in light of Kuwahara or of Sudo or of the hypothetical combination of Kuwahara, Sudo, Aoki and Goto, in any combination. Consequently, the rejection of the claims based on this reference or combination of references is in error. In view of the remarks submitted hereinabove, the references applied against Claims 2-17 on appeal do not render those claims unpatentable under either 35 U.S.C. § 102(e) or 35 U.S.C. § 103(a).

Thus, Appellant submits that the § 102 rejections and the § 103 rejections are in error and must be reversed.

Should any fees be required, authorization is hereby given to charge deposit account 19-1013.

Respectfully submitted,

Katherine R. Vieyra
Registration No. 47,155

Scully, Scott, Murphy & Presser, P.C.
400 Garden City Plaza, Suite 300
Garden City, New York 11530
(516) 742-4343

VIII. CLAIMS APPENDIX

Claim 1. (Canceled)

Claim 2. (Rejected) A spread code assigning method, for use in a code spread radio communication system including a first radio transmission device provided with a transmitter for transmitting different first through Mth code spread transmission signals from each of M (M is an integer of 2 or more) transmission antennas, and a second radio transmission device provided with a receiver for receiving and demodulating the first through Mth code spread transmission signals through N (N is an integer of 1 or more) reception antennas, for assigning spread codes to each of the transmission antennas, comprising:

calculating a correlation value of each of the propagation paths between the transmission antennas and the reception antennas;

preferentially assigning, to the ith (i is an integer of 1 or more and M or less) transmission antenna having a propagation path of a correlation value exceeding a predetermined threshold value, only spread codes orthogonal to the spread codes of the jth (j is an integer of 1 or more and M or less, $i \neq j$) transmission antenna corresponding to the correlation value or spread codes having a small cross correlation value to spread codes of the jth transmission antenna corresponding to the correlation value, and

assigning, to a transmission antenna having no propagation path of a correlation value exceeding the threshold value, spread codes without considering orthogonality to spread codes in the other transmission antennas.

Claim 3. (Rejected) The spread code assigning method as claimed in claim 2, wherein spread codes having a small cross correlation value to the spread codes of the jth transmission antenna are spread codes orthogonal to the spread codes of the jth transmission antenna.

Claim 4. (Rejected) The spread code assigning method as claimed in claim 2 or 3, wherein a standard correlation value is calculated based on each of the correlation values of the propagation paths between the M transmission antennas and the N reception antennas, and in the case of preset L threshold values of $x_0, x_1, ..., x_{(L-1)}$ ($0 \leq x_0 \leq x_1 \leq ... \leq x_{(L-1)} \leq 1$), the standard correlation value is x_p or more and below $x_{(p+1)}$ (p is an integer of 0 or more and (L-1) or less), a code multiplex number for the transmission antenna corresponding to the standard correlation value is set to be (L-p).

Claim 5. (Rejected) The spread code assigning method as claimed in claim 2 or 3, wherein a correlation value compared with the threshold value is a standard correlation value calculated based on a cross correlation value of each of the propagation paths between the M transmission antennas and the N reception antennas.

Claim 6. (Rejected) The spread code assigning method as claimed in claim 4, wherein the standard correlation value is the maximum value among the (M-1) x N correlation values obtained by calculating correlation values of a propagation path between the ith transmission antenna and the kth (k is an integer of 1 or more and N or less) reception antenna with propagation paths between the first, second, ..., (i-1)th, (i+1)th, ..., Mth transmission antennas and the kth reception antenna for the entire reception antennas.

Claim 7. (Rejected) The spread code assigning method as claimed in claim 5, wherein the standard correlation value is the maximum value among the (M-1) x N correlation values obtained by calculating correlation values of a propagation path between the ith transmission antenna and the kth (k is an integer of 1 or more and N or less) reception antenna with propagation paths between the first, second, ..., (i-1)th, (i+1)th, ..., Mth transmission antennas

and the kth reception antenna for the entire reception antennas.

Claim 8. (Rejected) The spread code assigning method as claimed in claim 4, wherein the standard correlation value is an average value among the (M-1) x N correlation values obtained by calculating correlation values of a propagation path between the ith transmission antenna and the kth (k is an integer of 1 or more and N or less) reception antenna with propagation paths between the first, second, ..., (i-1)th, (i+1)th, ..., Mth transmission antennas and the kth reception antenna for the entire reception antennas.

Claim 9. (Rejected) The spread code assigning method as claimed in claim 5, wherein the standard correlation value is an average value among the (M-1) x N correlation values obtained by calculating correlation values of a propagation path between the ith transmission antenna and the kth (k is an integer of 1 or more and N or less) reception antenna with propagation paths between the first, second, ..., (i-1)th, (i+1)th, ..., Mth transmission antennas and the kth reception antenna for the entire reception antennas.

Claim 10. (Rejected) A spread code assigning method, for use in a code spread radio communication system including a first radio transmission device provided with a transmitter for transmitting different first through Mth code spread transmission signals from each of M (M is an integer of 2 or more) transmission antennas, and a second radio transmission device provided with a receiver for receiving and demodulating the first through Mth code spread transmission signals through N (N is an integer of 1 or more) reception antennas, for assigning sprcad codes to each of the transmission antennas comprising:

detecting a reception quality at a time when

each of said code spread transmission signals is received;

reducing, in the case that the detected reception quality is below an object minimum

value, a maximum value of number of the spread codes assigned to the transmission antenna corresponding to the reception quality, and

increasing, in the case that the detected reception quality exceeds an object maximum value, the maximum value of the number of spread codes assigned to the transmission antenna corresponding to the reception quality.

Claim 11. (Rejected) The spread code assigning method as claimed in claim 10, wherein as the reception quality, any of a packet success rate, a signal to interference signal power ratio, or a bit error rate is used.

Claim 12. (Rejected) The spread code assigning method as claimed in claim 10 or 11, wherein a priority order of assigned spread codes is set for each transmission antenna, and in the case that the maximum value of the number of the spread codes assigned to each transmission antenna is relatively small, different spread codes orthogonal to each other are assigned to each of the transmission antennas.

Claim 13. (Rejected) A code spread radio communication system including a first radio transmission device provided with a transmitter for transmitting different first through Mth code spread transmission signals from each of M (M is an integer of 2 or more) transmission antennas, and a second radio transmission device provided with a receiver for receiving and demodulating the first through Mth code spread transmission signals through N (N is an integer of 1 or more) reception antennas,

wherein the receiver is provided with a correlation value estimation unit for calculating a correlation value of each propagation path between each of the transmission antennas and each of the reception antennas and transmitting the calculated result as propagation path correlation information,

wherein the transmitter is provided with a spread code assigning unit, and

wherein the spread code assigning unit, based on the propagation path correlation information, assigns, to the ith (i is an integer of 1 or more and M or less) transmission antenna having a propagation path of a correlation value exceeding a predetermined threshold value, only spread codes orthogonal to the spread codes of the jth (j is an integer of 1 or more and M or less, $i \neq j$) transmission antenna corresponding to the correlation value, and assigns, to a transmission antenna having no propagation path of a correlation value exceeding the threshold value, spread codes without considering orthogonality to spread codes in the other transmission antennas.

Claim 14. (Rejected) The code spread radio communication system as claimed in claim 13, wherein the spread code assigning unit preferentially assigns, based on the propagation path correlation information, to the ith (i is an integer of 1 or more and M or less) transmission antenna having a propagation path of a correlation value exceeding a predetermined threshold value, spread codes having a small cross correlation value to the spread codes of the jth (j is an integer of 1 or more and M or less, $i \neq j$) transmission antenna corresponding to the correlation value, and assigns, to a transmission antenna having no propagation path of a correlation value exceeding the threshold value, spread codes without considering orthogonality to spread codes in the other transmission antennas.

Claim 15. (Rejected) The code spread radio communication system as claimed in claim 14, wherein the spread codes having a small cross correlation value to the spread codes of the jth transmission antenna are spread codes orthogonal to the spread codes of the jth transmission antenna.

Claim 16. (Rejected) A code spread radio communication system including a first radio transmission device provided with a transmitter for transmitting different first through Mth code

spread transmission signals from each of M (M is an integer of 2 or more) transmission antennas, and a second radio transmission device provided with a receiver for receiving and demodulating the first through Mth code spread transmission signals with N (N is an integer of 1 or more) reception antennas, wherein

the receiver is provided with a reception quality detection unit for detecting reception quality at a time when each of the code spread transmission signals is received and a code multiplex number control signal generating unit, the code multiplex number control signal generating unit, in the case that the reception quality is below an object minimum value, transmitting the code multiplex number control information indicating decreasing of the maximum value of the number of spread codes assigned to the transmission antenna corresponding to the concerned reception quality, and also, in the case that the reception quality exceeds an object maximum value, transmitting the code multiplex number control information indicating increasing of the maximum value of the number of spread codes assigned to the transmission antenna corresponding to the concerned reception quality, and wherein

the transmitter is provided with a spread code assigning unit for assigning spread codes to each of the transmission antenna based on the code multiplex number control information.

Claim 17. (Rejected) The code spread radio communication system as claimed in claim 16, wherein the reception quality is any of a packet success rate, a signal to interference signal power ratio, or a bit error rate.

IX. EVIDENCE APPENDIX

Not applicable.

X. RELATED PROCEEDINGS APPENDIX

Not applicable.